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CONSTANT POTENTIAL

From Dr. Robert S. Brush
REFERENCE

ARC LAMPS

FOR

INCANDESCENT

CIRCUITS.

1888



THE BRUSH
ELECTRIC CO.,

CLEVELAND
OHIO





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CONSTANT POTENTIAL

Arc Lamps,

— FOR —

Incandescent Circuits.

Manufactured by

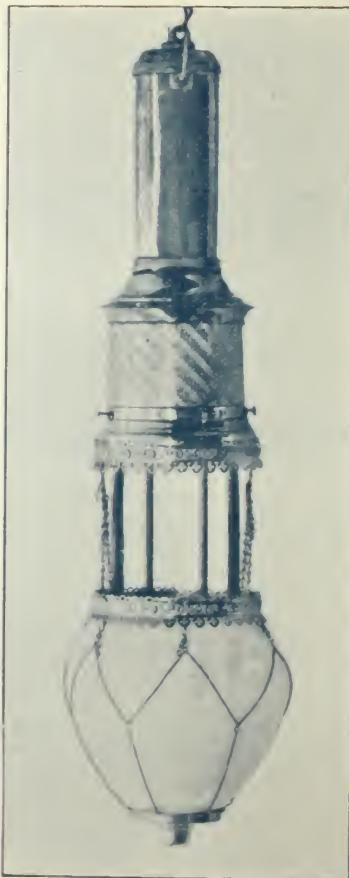
THE BRUSH ELECTRIC CO.,

Cleveland, Ohio.

+

Ornamental
Double
Constant
Potential
Brush Arc Lamp.

+



Introduction.



THE subject of arc lamps is an old one, especially with us. During the past fifteen years we have seen many new arc lamps pushed into the market, only to be soon abandoned. The general public quickly discovers, at its cost, the many defects due to hurried designs and careless construction of apparatus made by the inexperienced.

Consequently our experiments with new apparatus have been especially thorough and the apparatus adopted only after exhaustive tests. **OUR NEW CONSTANT POTENTIAL ARC LAMP FOR INCANDESCENT CIRCUITS** is the result of over two years' experimenting in this line. It is not excelled in simplicity, efficiency and durability.

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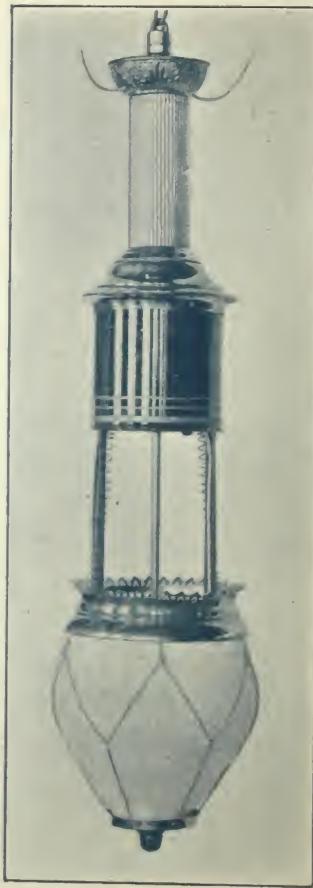
Standard Single

Constant

Potential

Brush Arc Lamp.

+



THE BRUSH CONSTANT POTENTIAL ARC LAMP.

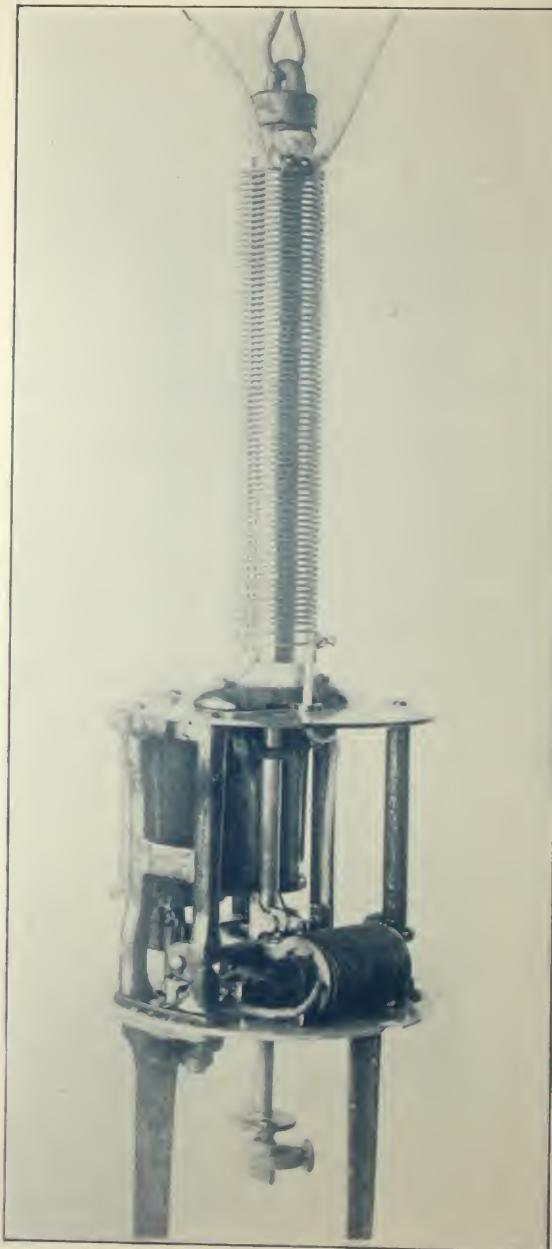
The growing demand for a reliable Constant Potential Arc Lamp for use on incandescent circuits has led us to design a lamp which would prove satisfactory under the various severe conditions to which such lamps are subject.

The practical abandonment of all forms of clock-work mechanism in arc lamps for constant current, because of their unreliability, their frequent need of adjustment and cost of repairs, is a lesson too plain to be lost sight of. It must be remembered that most arc lamps for incandescent circuits are trimmed and cared for by those who do not make it a regular business, and therefore it is even more necessary than for constant current lamps that the constant potential lamp be simple, durable, and permanent of adjustment.

The description of the new BRUSH CONSTANT POTENTIAL ARC LAMP was written by Mr. T. E. Adams, of The Brush Electric Company, who has for the past twelve years devoted his attention to the improvement and manufacture of arc lamps. During the past two years he has devoted special attention to the lamp herewith described.

—
Mechanism of
Constant
Potential
Arc Lamp.

+



We present a lamp without any of the objectionable features found in lamps of the "clock work" type. A movement which uses a rack and pinion will cause trouble as soon as dirt and dust begin to clog up the parts. A movement employing springs is unsatisfactory because the tension of the spring will vary and require constant attention to preserve its adjustment. Escapements are unreliable and far too delicate to withstand the rough usage which an arc lamp experiences under ordinary conditions. They easily get out of order and need frequent cleaning and repairing to insure smooth running. Therefore we have avoided all these movements. We know of no lamp on the market that will not be adjusted and repaired many times before this one needs re-adjusting. Absence of springs renders permanent adjustment possible and as the magnetism lifts against the weight of the moving parts, friction is relieved and wear reduced to a minimum.

The well known simplicity of design and construction of the Brush apparatus is especially noticeable in this new lamp. There are no parts put in to display ingenuity, but simply a strong plain mechanism, every part of which survives because of its fitness to make complete a lamp that will give good service years after its most durable competitor is in the scrap heap.

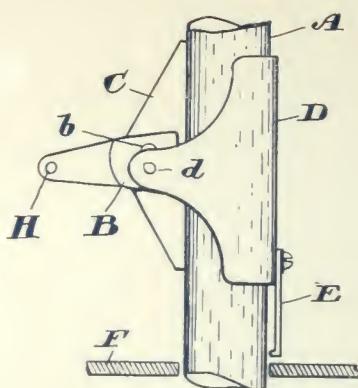


FIG. 1.

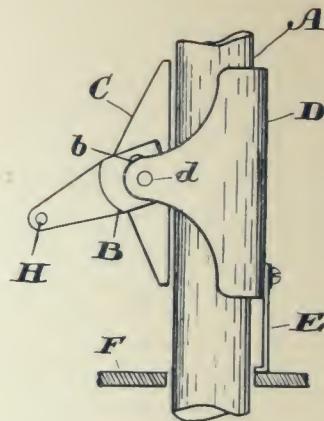


FIG. 2.

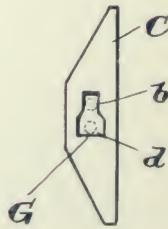


DIAGRAM OF CLUTCH.

Several desirable features in our regular constant current lamp have been adapted to the requirements of the new constant potential lamp and among these is the clutch which has long proved so durable and efficient. It is the result of fifteen years experience with all kinds of lamp clutches and will be found far superior to any other clutch on the market.

The same letter represents the same part in each diagram.

- A.* Represents the lamp rod.
- B.* The clutch lever.
- C.* The clutch shoe.
- D.* The clutch saddle.
- E.* The clutch trip.
- F.* The lamp bottom plate.
- G.* Slotted rivet hole through *C*.
- H.* Rivet hole through *B*.

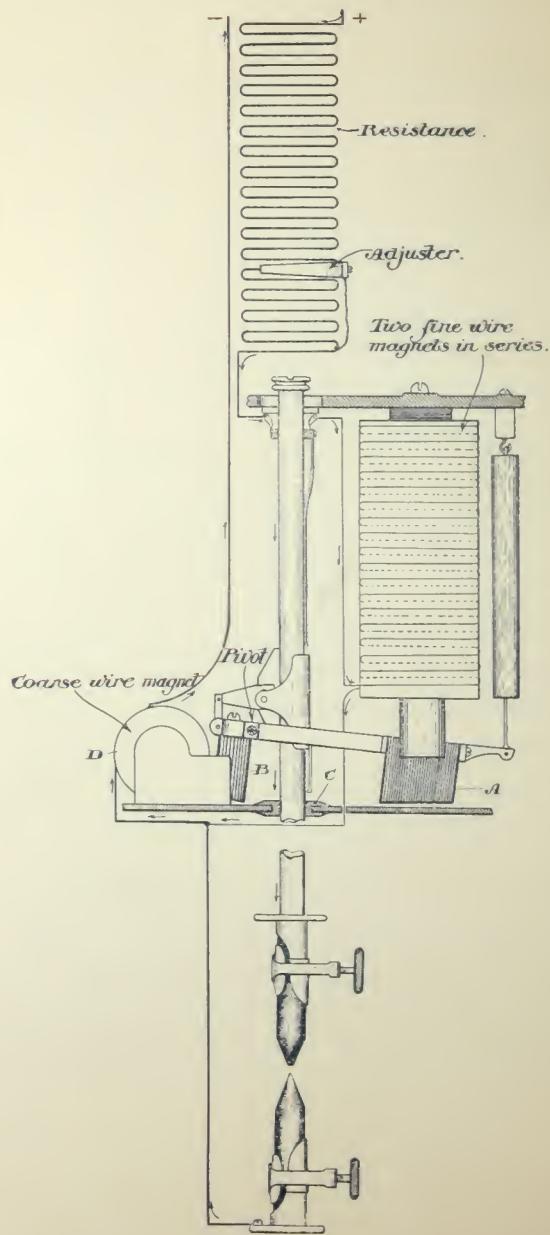
b and *d* represent rivets.

The clutch lever B is supported at H by an armature lever.

Fig. 1 shows the clutch gripping the rod, and as the armature moves up and down it will carry the rod also. However, in descending, the clutch will only grip the rod until the trip E touches the plate F, when any further fall of H will release the rod by pulling C back as in Fig. 2. The raising of the armature lever at H immediately closes the clutch and lifts the rod with the lever.

This clutch presents such a long gripping surface that a dent or enlargement in the lamp rod will not effect its operation in the least. The opening G is of such form as to prevent clogging by dirt or dust and never requires cleaning or repairing.

The air pot is the same as used for years on the standard single and double Brush Adams arc lamps (No. 30, No. 31,) and is simply for preventing a noisy, jerky action of the armature lever. No oil, wax or glycerine is used, only a smooth cylinder with loose fitting plunger which never gets out of order and has given entire satisfaction in every instance.



On the opposite page is a diagram of the lamp showing the carbons separated as when the lamp is not burning. When the current is switched on its only path is through the fine wire magnets which at once draw up the armature *A*, slowly lowering the clutch and rod until the carbon points come in contact.

If the trimming of the lamp is regular the carbon points will touch together before the clutch releases the rod, consequently the carbons cannot lap, (a common trouble with constant potential lamps) for the instant the points touch, a path for the current is closed through the coarse wire magnet *D* which attracts the armature *B*, overcomes the pull of the fine wire magnets and lifts the clutch which again separates the carbons and establishes the arc. The pull of the fine wire magnets is constant and the strength of the coarse wire magnet varies with the resistance of the arc as they are in series. As the carbons burn away the resistance of the arc increases, and consequently the current flowing through the coarse wire magnet decreases until the fine wire magnets overcome its pull and slowly lower the carbon rod, thus maintaining a constant arc until the clutch trip reaches the plate *C* and releases the clutch. This allows the carbon rod to slide downward a little, but it is instantly caught and raised by the clutch as the carbon points come nearer and allow increasing current to pass through the coarse wire magnet.

This is the working of the lamp, and in practice it is found to be as nearly perfect as it is possible to construct an arc lamp.

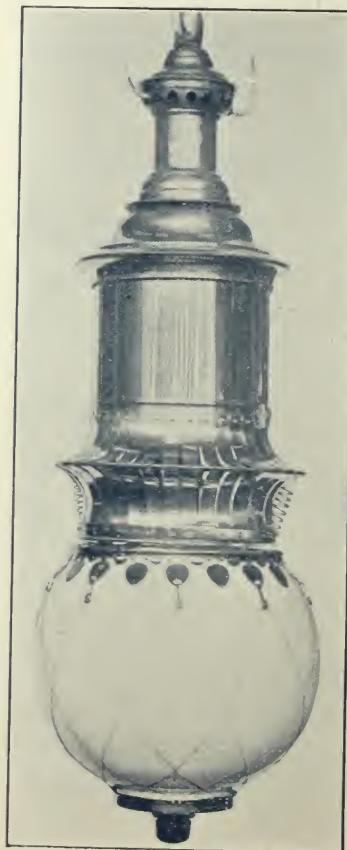
When the carbons have been consumed, the circuit will be opened at the arc of the first pair of carbons that can feed no more, and the carbons in the other lamp that are not yet consumed will continue to touch and spark slightly, thus indicating that it is the dark lamp which needs trimming.

No harm will result if lamps are allowed to remain untrimmed, and the only loss will be the slight current (.175 of an ampere) passing through the fine wire until the circuit is opened at the switch. Experience has shown us that no cut-out is needed as the resistance of the fine wire is sufficient to prevent burning out in case of accident to the carbons.

+

ORNAMENTAL
SHORT
LAMP.

+



RESISTANCE.

This point has received careful attention and the results are in every way satisfactory. The lamps will be furnished with resistance contained in cylinder at top of lamp, where it is well insulated and thoroughly ventilated, or in separate box.

The fine wire magnets are connected to the circuit by coiled springs, which are extremely convenient in connecting and disconnecting. These are not resistances.

The regular constant current lamps are easily taken apart and put together without solder, and the same is true of this lamp.

ADJUSTMENT.

All lamps are accurately adjusted before leaving the factory, and nothing but the resistance need be attended to when it is desirable to change the ampereage of the lamp. This is a very simple operation, without even the use of a screwdriver.

Sometimes the separation of the carbons may be so sudden as to break the circuit, which is the cause of so-called "chattering," and indicates that the E. M. F. is too low for the adjustment of the lamp except as it occurs at time of first starting, when it is caused by the carbon points being cold, and will cease quickly as they become heated.

When two lamps are to burn in series on 100-110 volt circuit the best results are obtained by using a good quality of cored carbon for the upper or positive carbon. This point may be ignored when but one lamp is used or when many are used in series.

DOUBLE CARBON LAMPS.

The Double Carbon Lamp was one of Mr. Brush's great inventions. The patents on it have been sustained by upwards of fifteen decisions of the United States Courts.

A single carbon lamp will not burn throughout the night unless unusually large carbons are used, and large carbons are undesirable, because they do not give a steady light. The Double Carbon Lamp will burn from fifteen to sixteen hours without retrimming. They give a better light and at the same time are cleaner and more economical to operate.

Write for further information if desired and for prices.



THE NEW CONSTANT CURRENT LAMP.

The Brush-Adams Constant Current Lamp, which is probably more widely used throughout the world than any other lamp on the market, is fully described in another catalogue. A very fair idea of the lamp may be obtained from the following cuts.



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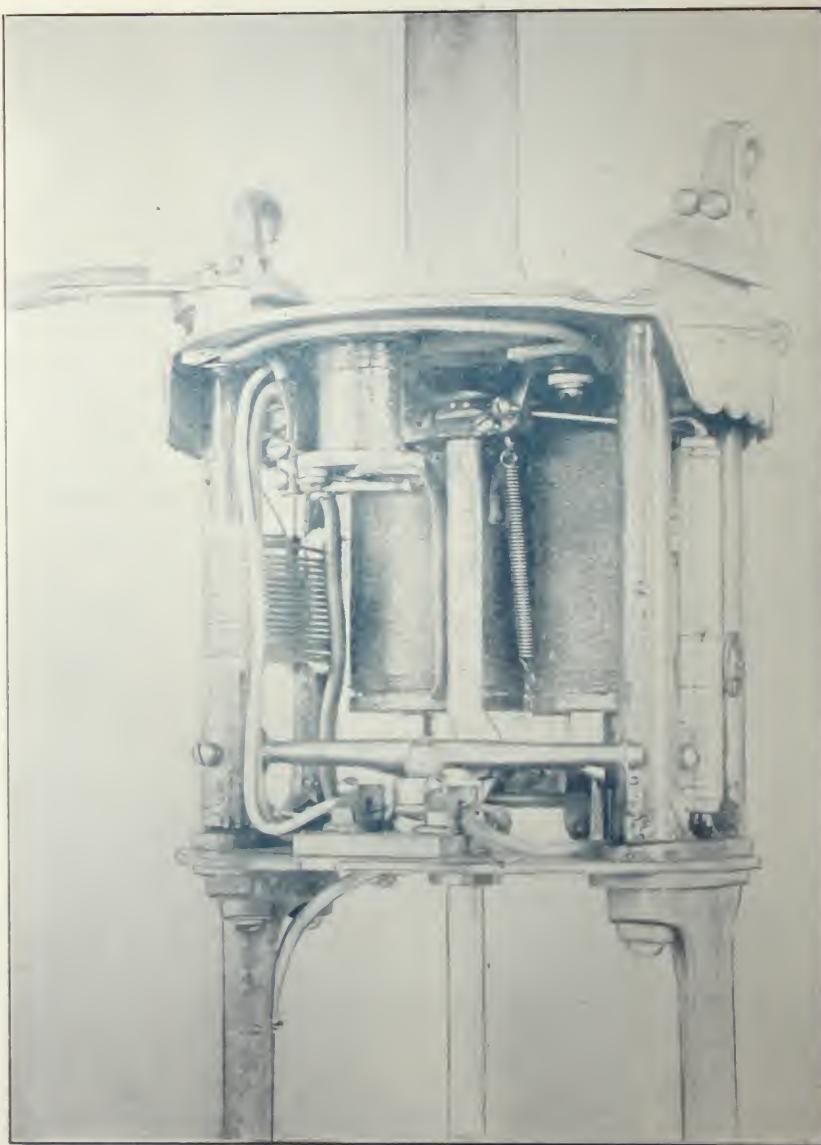
Brush-Adams

Constant

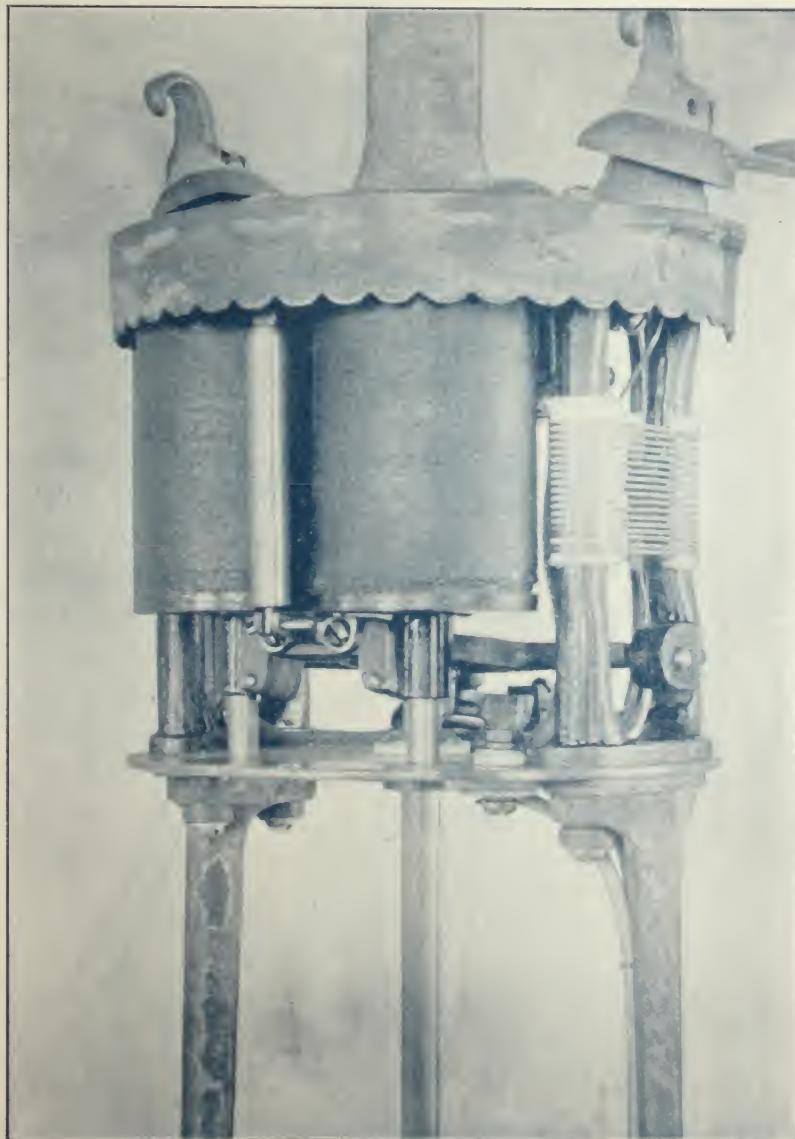
Current

Lamp.

+



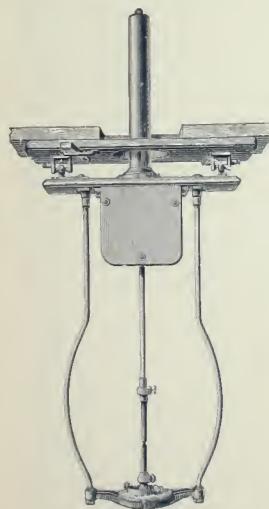
BRUSH-ADAMS CONSTANT CURRENT LAMP.



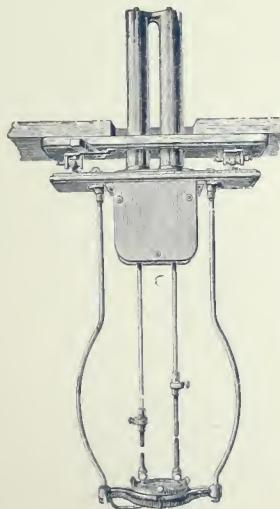
BRUSH-ADAMS CONSTANT CURRENT LAMP.

THE OLD CONSTANT CURRENT LAMP.

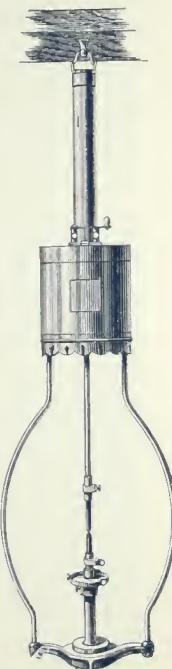
The old Brush Constant Current Lamp is so universally used and so well known all over the world that any special description of it is unnecessary. It has occupied the very first position in the history of arc lamps, and all of its salient points and successful features have been embodied and preserved in the later lamps. We still manufacture the old lamps, and are daily supplying them and all parts of same to our customers. The following cuts represent lamps manufactured and kept in stock. Any of the other styles of the old lamp will be made specially if called for.



No. 16.



No. 17.



No. 18.

No. 16, SHORT ROD, PLAIN LAMP, SINGLE.

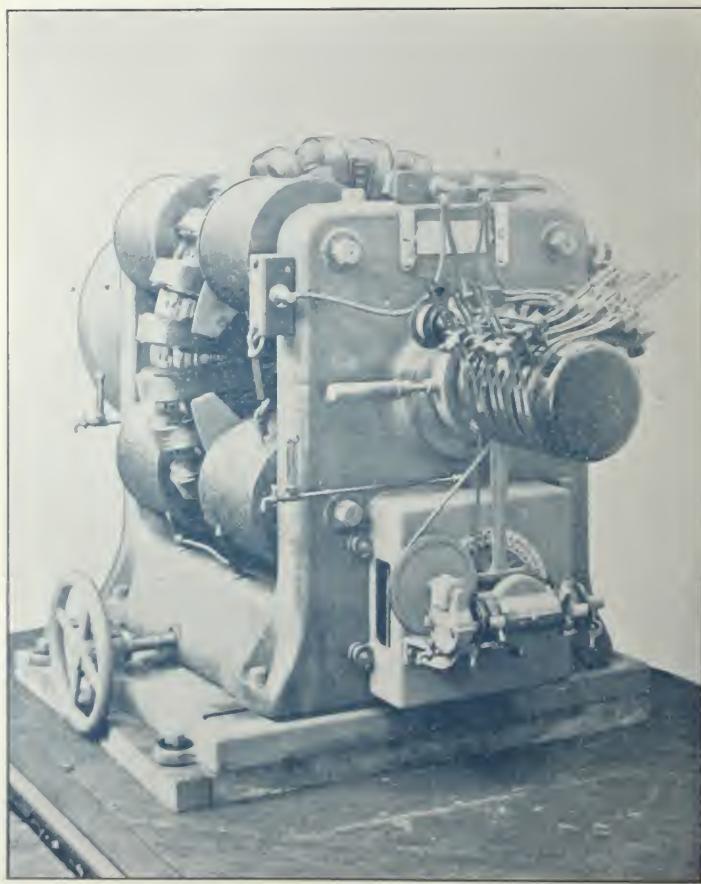
No. 17, SHORT ROD, PLAIN LAMP, DOUBLE.

No. 18, BRASS TOP, LONG OR SHORT ROD, SINGLE.

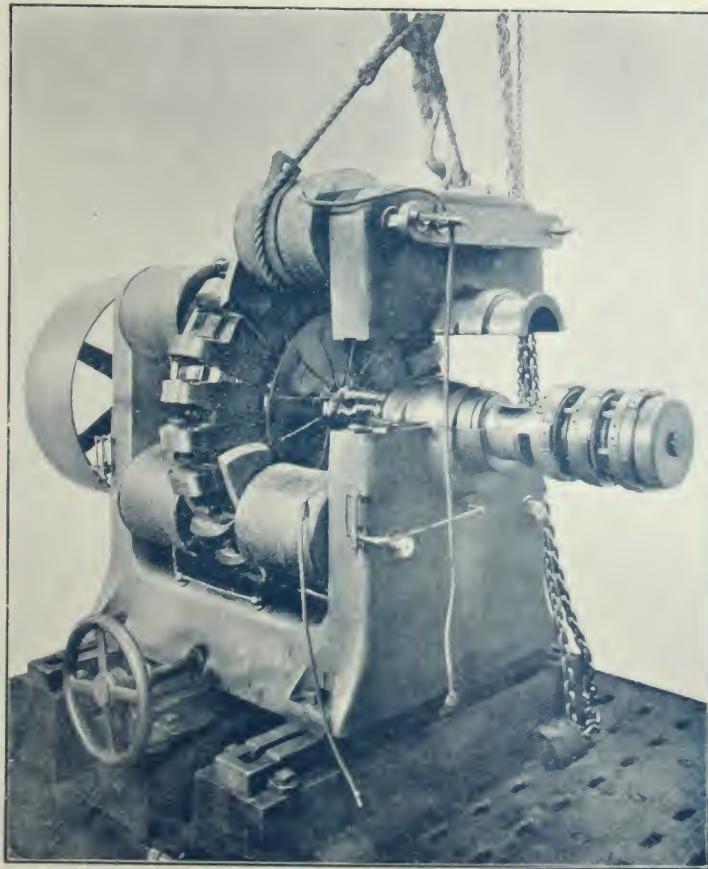
We are just publishing a catalogue entitled "SIXTEEN YEARS'
USE OF BRUSH APPARATUS." It is of interest. Send for it.



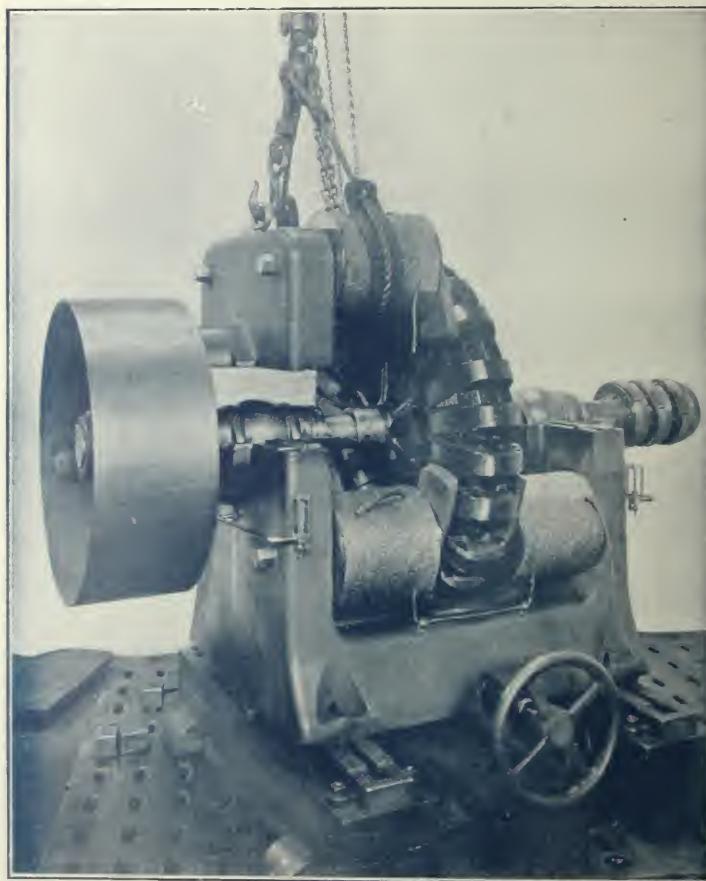
125 2000-CANDLE POWER BRUSH ARC DYNAMO, COUPLED DIRECT
TO A VERTICAL COMPOUND ENGINE AS EXHIBITED
AT THE WORLD'S FAIR.



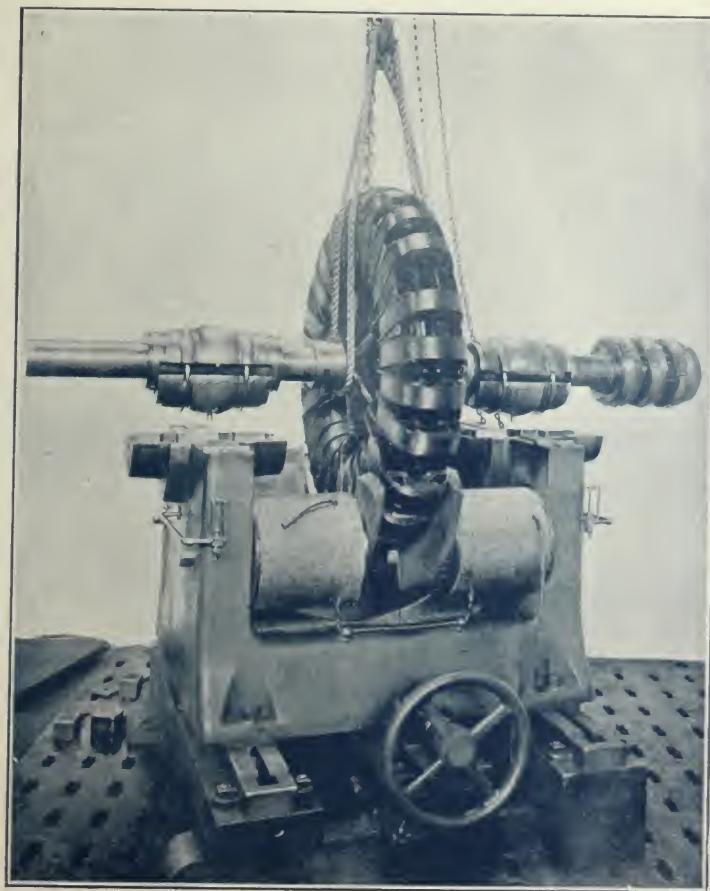
NO. 11 BRUSH ARC DYNAMO WITH AUTOMATIC REGULATOR.
CAPACITY 125 2000-C. P. LAMPS.



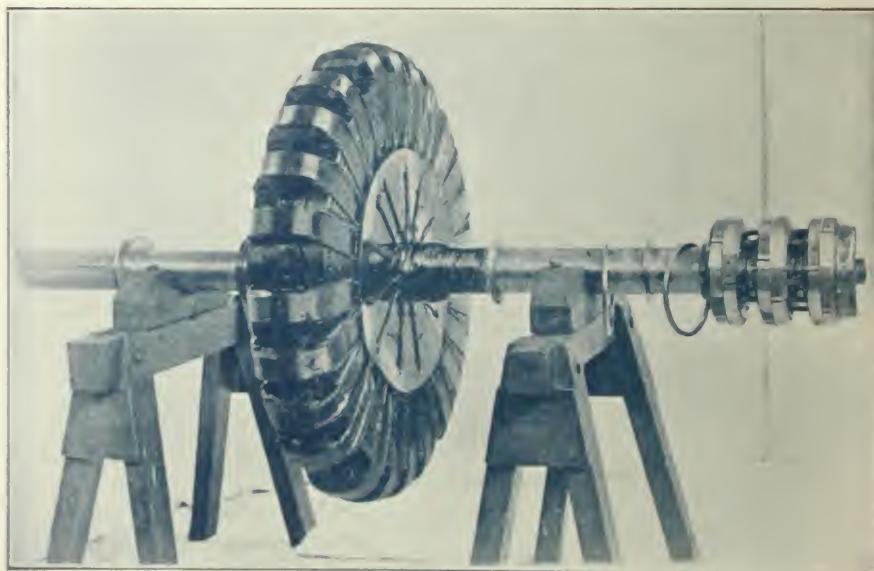
DETAIL OF NO. 11 ARC DYNAMO.



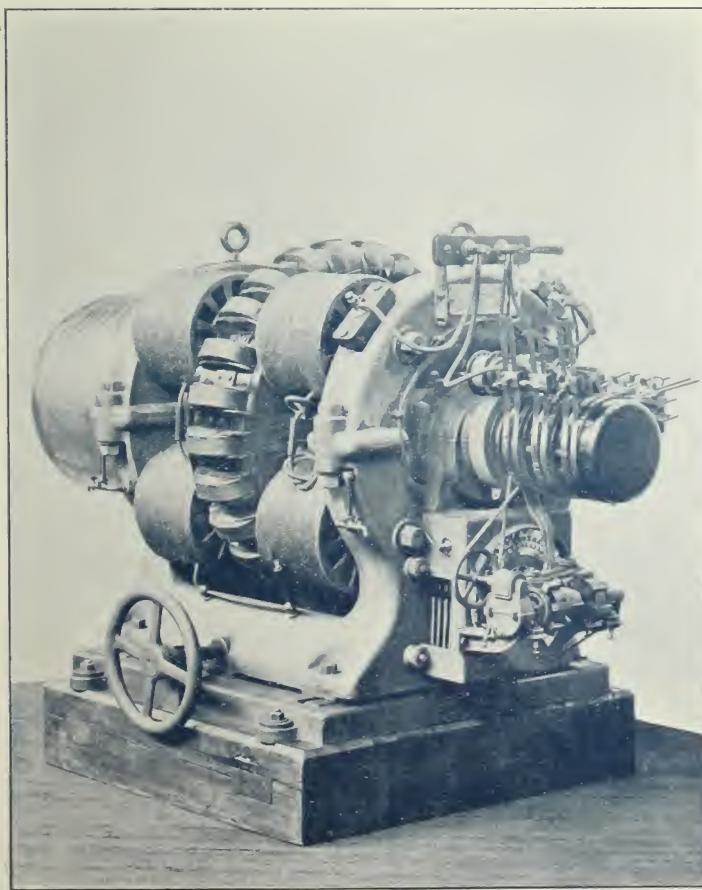
DETAIL OF NO. 11 AEC DYNAMO.



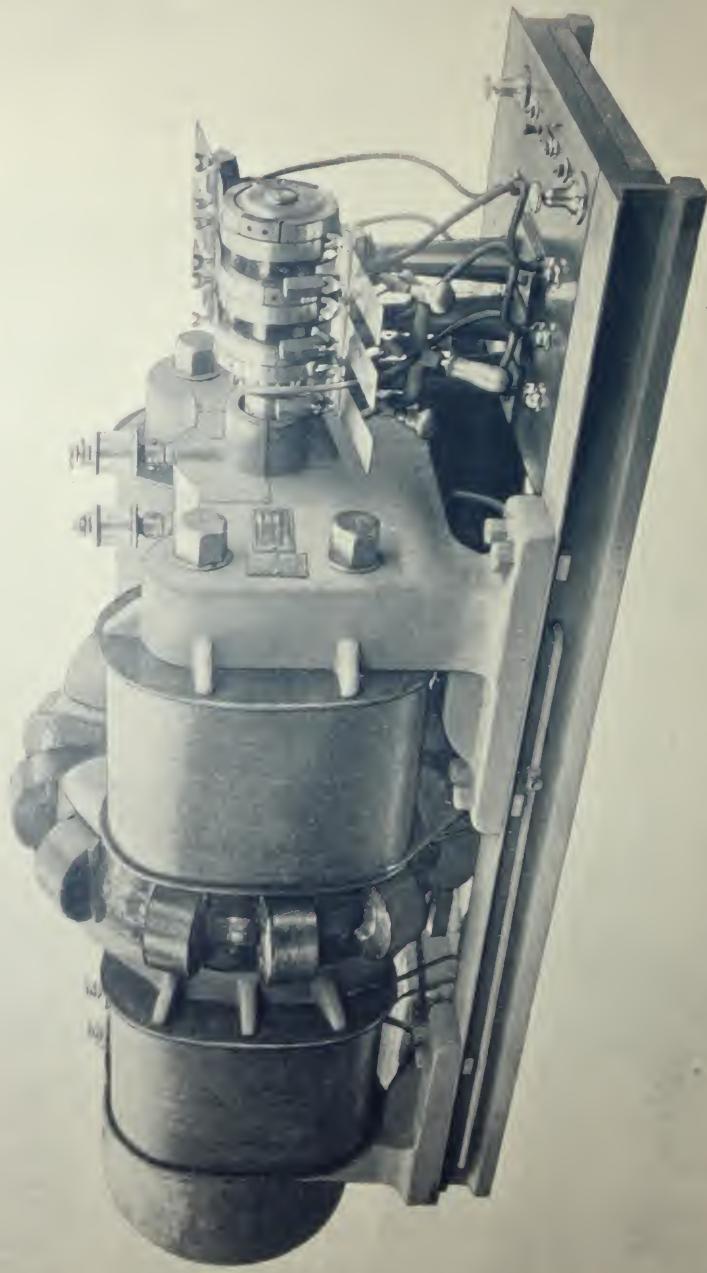
DETAIL OF NO. II ARC DYNAMO.



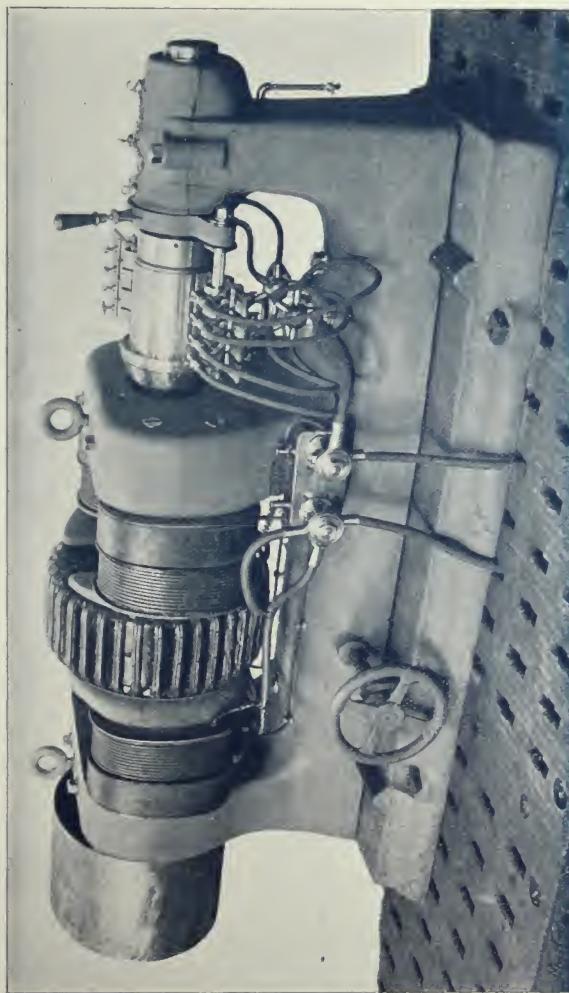
ARMATURE OF NO. 11 ARC DYNAMO.



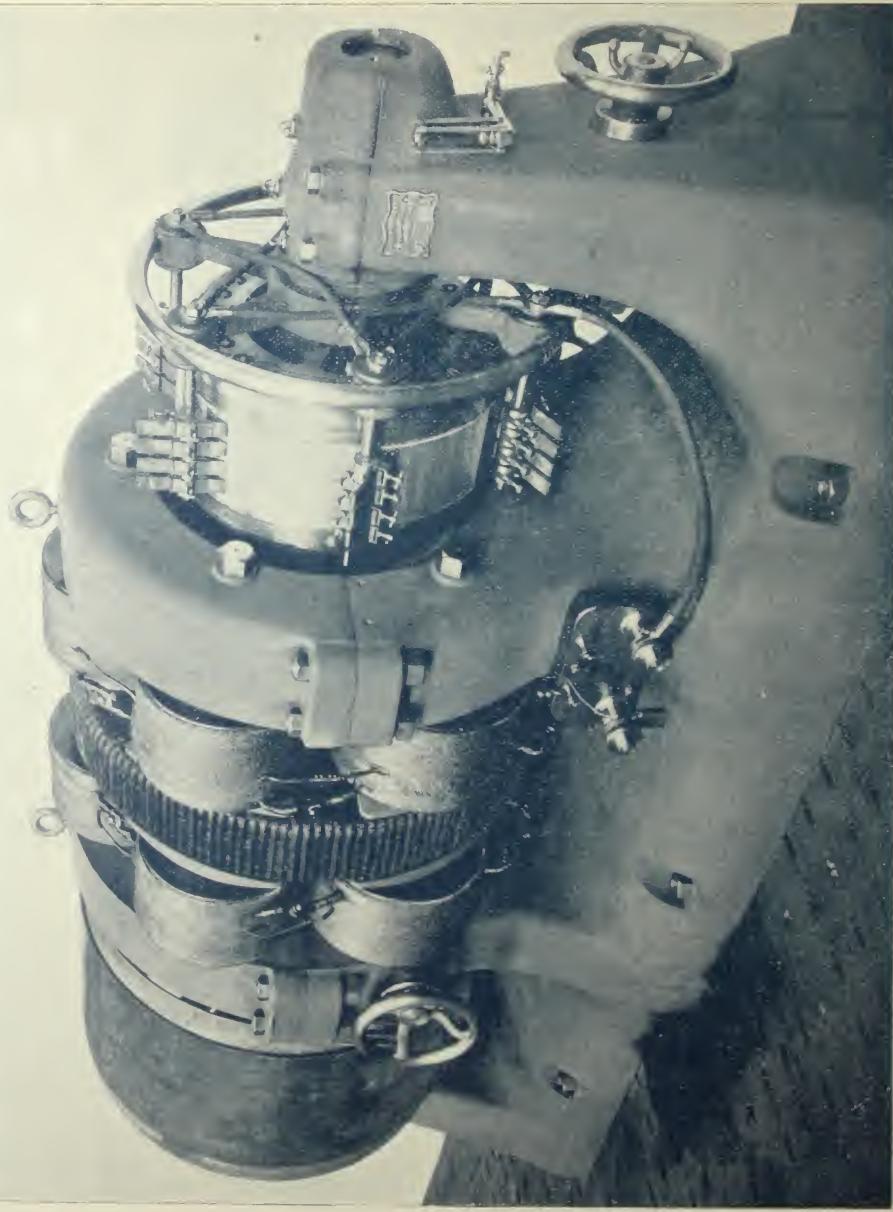
NO. 10 BRUSH ARC DYNAMO WITH AUTOMATIC REGULATOR,
CAPACITY 100 2000-C. P. LAMPS.



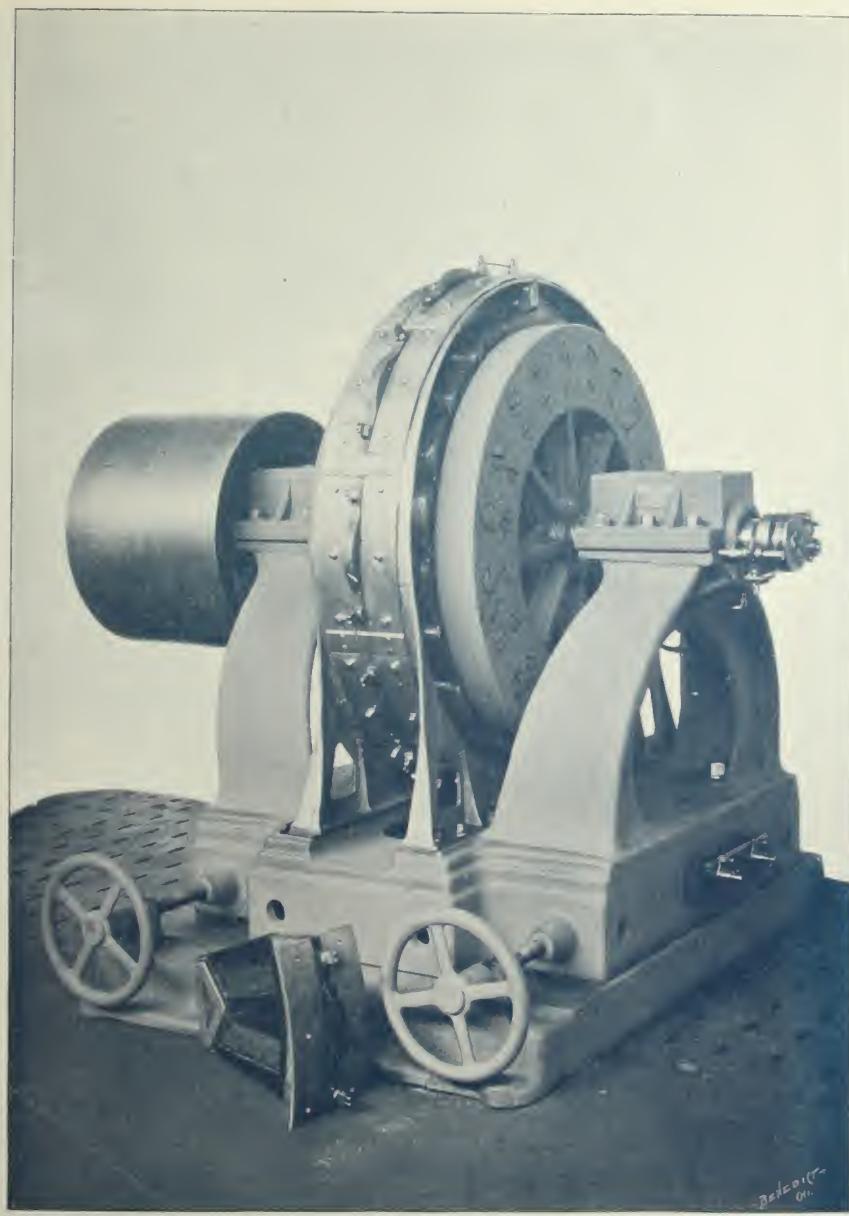
NO. 8 BRUSH ARC DYNAMO, CAPACITY 65 2000-C. P. LAMPS.



BRUSH INCANDESCENT DIRECT CURRENT DYNAMO.



BRUSH GENERATOR, CAPACITY 300,000 WATTS.



BRUSH ALTERNATING DYNAMO, CAPACITY 3000 16-C. P. LAMPS.



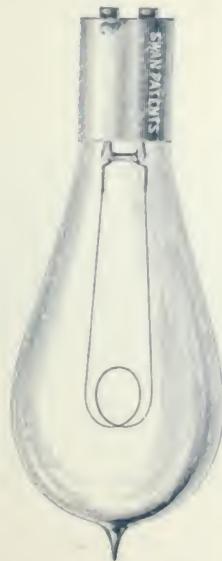
HOTEL FUJI, MIYANOSHITA, JAPAN. LIGHTED WITH BRUSH INCANDESCENT LIGHTS.





The _____

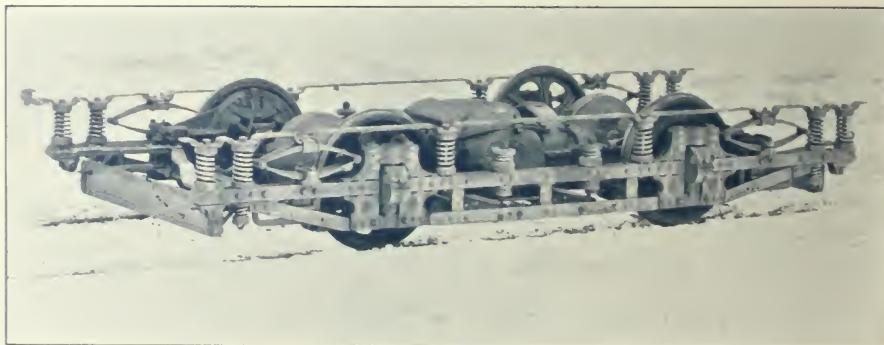
Swan Lamp Manufacturing Co.,
CLEVELAND, OHIO.



The Swan Lamp is an English lamp and has been manufactured for upwards of 14 years. Much has been learned, improvements made, efficiency increased, life lengthened. The Swan Lamp is more largely used abroad than any other.

IN street railway work the importance of an equipment that will reduce repairs and wear and tear on the trucks, motors, wheels and track, cannot be overestimated.

This is accomplished by the celebrated flexibly suspended, Single Motor Equipment and Electric Brake of



THE SPERRY ELECTRIC RAILWAY COMPANY,
CLEVELAND, O.